

CLAIMS

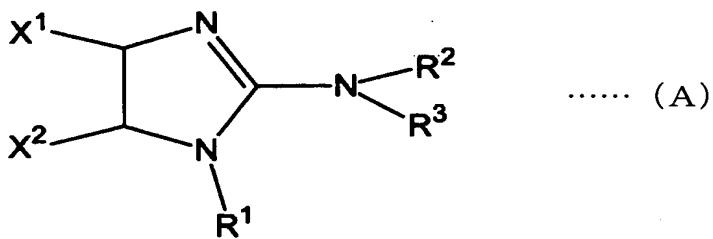
1. A switching element which comprises:

an organic bistable material, the organic bistable material having two stable states in resistance under applied voltage;

at least two electrodes, the electrodes being placed such that the organic bistable material is arranged between two of the electrodes,

the switching element being characterized in that the organic bistable material consists essentially of a compound having an electron-donating functional group and an electron-accepting functional group in a molecule of said compound.

2. The switching element according to Claim 1, wherein the compound is an aminoimidazole type compound of the following formula (A):

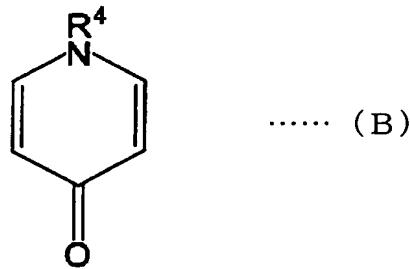


wherein each of X¹ and X² is CN or NO₂, and each of R¹, R² and R³ is a hydrogen atom or a C₁₋₆ alkyl group which may have a

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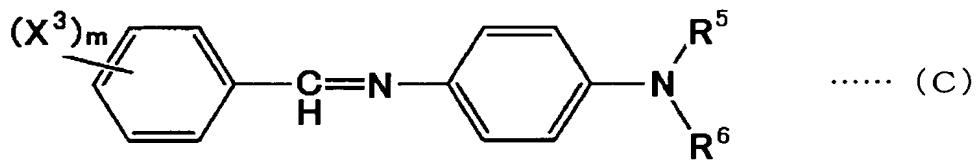
substituent.

3. The switching element according to Claim 1, wherein the compound is a γ -pyridone type compound of the following formula (B):



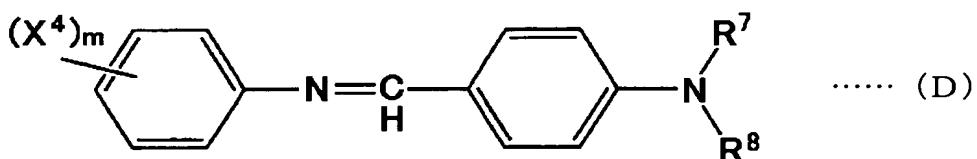
wherein R⁴ is a hydrogen atom or a C₁₋₆ alkyl group which may have a substituent.

4. The switching element according to Claim 1, wherein the compound is an imine type compound of the following formula (C):



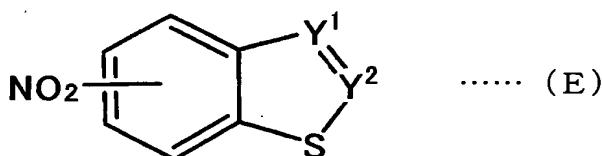
wherein X³ is CN or NO₂, each of R⁵ and R⁶ is a hydrogen atom or a C₁₋₆ alkyl group which may have a substituent, and m is an integer of 1 to 5.

5. The switching element according to Claim 1, wherein the compound is an imine type compound of the following formula (D) :



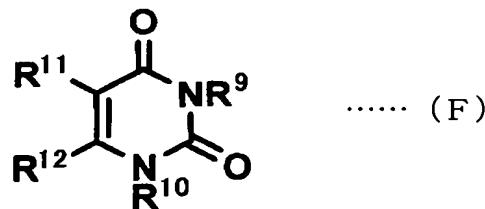
wherein X^4 is CN or NO_2 , each of R^7 and R^8 is a hydrogen atom or a C_{1-6} alkyl group which may have a substituent, and m is an integer of 1 to 5.

6. The switching element according to Claim 1, wherein the compound is a compound of the following formula (E) :



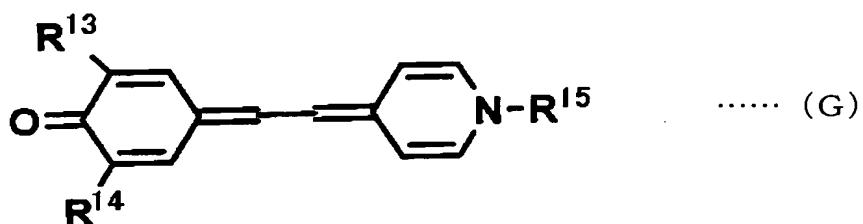
wherein either one of Y^1 and Y^2 is a nitrogen atom, and another one thereof is a carbon atom which has as a substituent an amino group or a C_{1-6} alkylamino group.

7. The switching element according to Claim 1, wherein the compound is a compound of the following formula (F) :



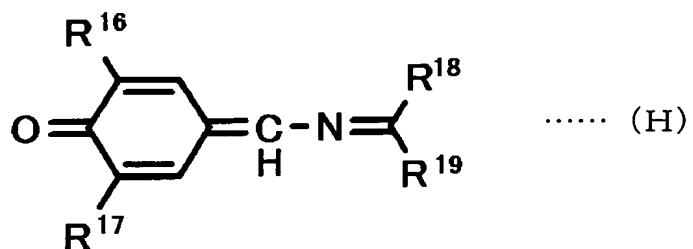
wherein each of R⁹ and R¹⁰ is a hydrogen atom or an alkyl group having at most 2 carbon atoms, and each of R¹¹ and R¹² is a hydrogen atom or an amino group.

8. The switching element according to Claim 1, wherein the compound is a compound of the following formula (G):



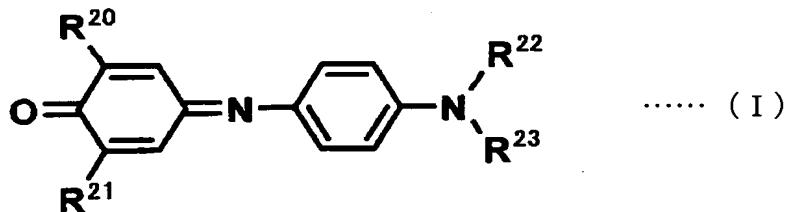
wherein each of R¹³, R¹⁴ and R¹⁵ is a hydrogen atom or a C₁₋₆ alkyl group which may have a substituent.

9. The switching element according to Claim 1, wherein the compound is an iminequinone type compound of the following formula (H):



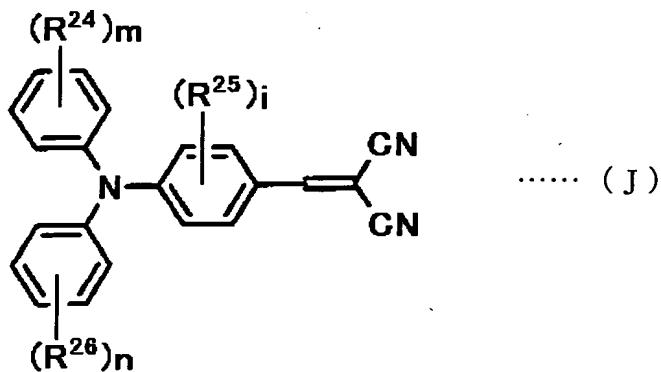
wherein each of R¹⁶ and R¹⁷ is a hydrogen atom or a C₁₋₆ alkyl group which may have a substituent, and each of R¹⁸ and R¹⁹ is an aryl group which may have a substituent, a C₁₋₆ alkyl group which may have a substituent, or a hydrogen atom, provided that at least one of R¹⁸ and R¹⁹ is an aryl group which may have a substituent.

10. The switching element according to Claim 1, wherein the compound is a quinoneimine compound of the following formula (I):



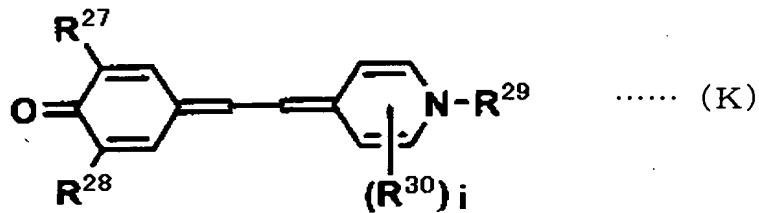
wherein each of R²⁰ to R²³ is a hydrogen atom or a C₁₋₆ alkyl group which may have a substituent.

11. The switching element according to Claim 1, wherein the compound is a dicyano type compound of the following formula (J):



wherein each of R^{24} , R^{25} and R^{26} is a hydrogen atom, a C_{1-6} alkyl group which may have a substituent, an aryl group which may have a substituent, a C_{1-6} alkoxy group which may have a substituent, each of m and n is an integer of 1 to 5, and i is an integer of 1 to 4.

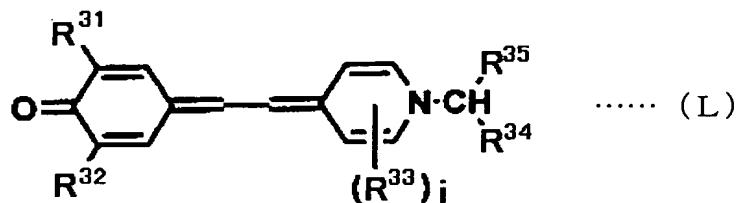
12. The switching element according to Claim 1, wherein the compound is a pyridone type compound of the following formula (K):



wherein each of R^{27} , R^{28} and R^{29} is a hydrogen atom, a C_{1-6} alkyl group which may have a substituent, or an aryl group which may have a substituent, R^{30} is a C_{1-6} alkyl group which may have a substituent, or a residual group which is capable of forming

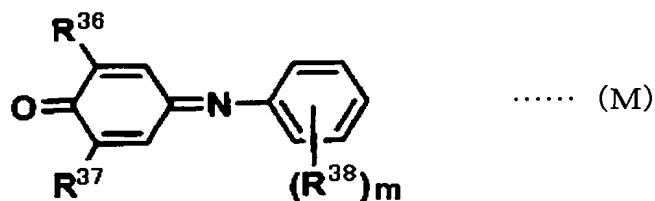
a ring, and i is an integer of 1 to 4.

13. The switching element according to Claim 1, wherein the compound is a pyridone type compound of the following formula (L):



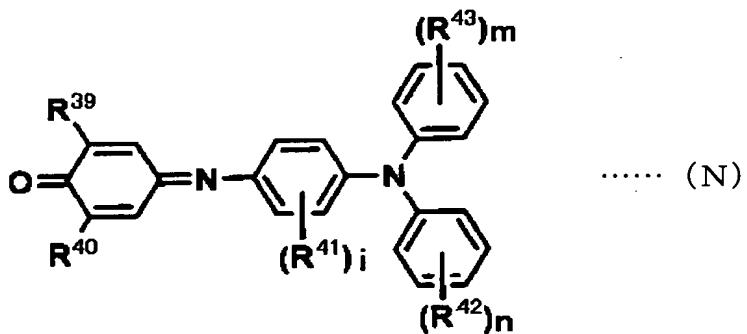
wherein each of R^{31} and R^{32} is a hydrogen atom or a C_{1-6} alkyl group which may have a substituent, R^{33} is a C_{1-6} alkyl group which may have a substituent, or a residual group which is capable of forming a ring, each of R^{34} and R^{35} is an aryl group which may have a substituent, or a hydrogen atom, provided that at least one of R^{34} and R^{35} is an aryl group which may have a substituent, and i is an integer of 1 to 4.

14. The switching element according to Claim 1, wherein the compound is a quinoneimine type compound of the following formula (M):



wherein each of R^{36} and R^{37} is a hydrogen atom, a C_{1-6} alkyl group which may have a substituent, or an aryl group which may have a substituent, R^{38} is a C_{1-6} alkyl group which may have a substituent, an aryl group which may have a substituent, or a residual group which is capable of forming a ring, and m is an integer of 1 to 5.

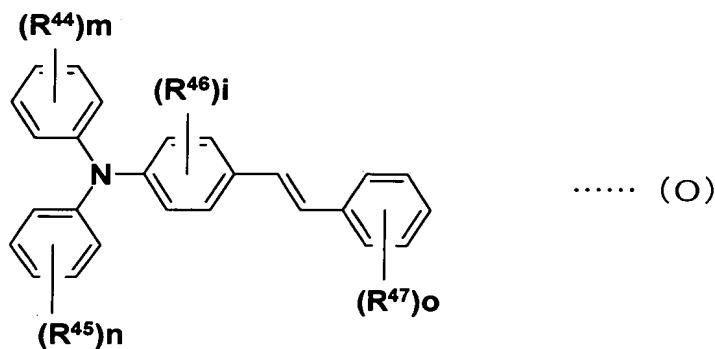
15. The switching element according to Claim 1, wherein the compound is a quinoneimine type compound of the following formula (N):



wherein each of R^{39} and R^{40} is a hydrogen atom or a C_{1-6} alkyl group which may have a substituent; each of R^{41} , R^{42} and R^{43} is a hydrogen atom, a C_{1-6} alkyl group which may have a substituent, an aryl group, or a residual group which is capable of forming a ring; i is an integer of 1 to 4; and each of m and n is an integer of 1 to 5.

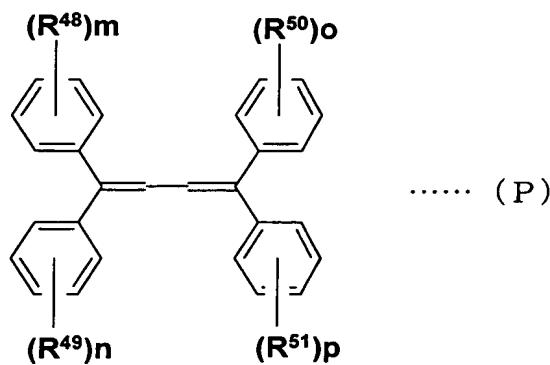
16. The switching element according to Claim 1, wherein the compound is a stilbene type compound of the following

formula (O) :



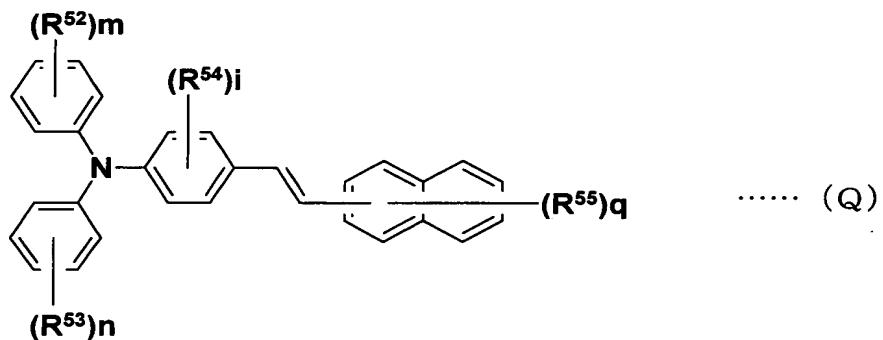
wherein each of R^{44} , R^{45} and R^{46} is a hydrogen atom, a C_{1-6} alkyl group which may have a substituent, a C_{1-6} alkoxy group which may have a substituent, an amino group which may have a substituent, or an aryl group which may have a substituent; R^{47} is a hydrogen atom, a halogen atom, a nitro group, a cyano group or an aryl group which may have a substituent; each of m , n and o is an integer of 1 to 5; and i is an integer of 1 to 4.

17. The switching element according to Claim 1, wherein the compound is a butadiene type compound of the following formula (P) :



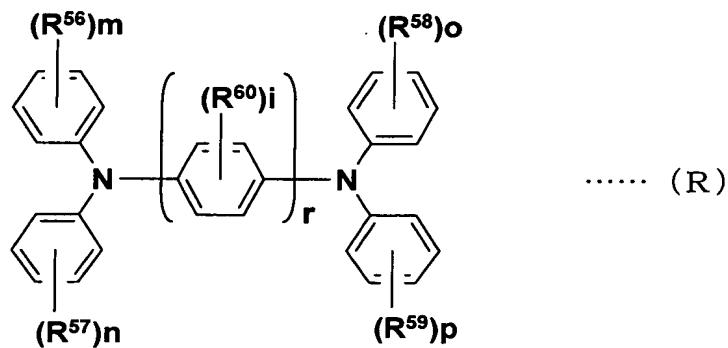
wherein each of R⁴⁸ and R⁴⁹ is a hydrogen atom, a halogen atom, a nitro group, a cyano group or an aryl group which may have a substituent; each of R⁵⁰ and R⁵¹ is a hydrogen atom, a C₁₋₆ alkyl group which may have a substituent, a C₁₋₆ alkoxy group which may have a substituent, an amino group which may have a substituent, or an aryl group which may have a substituent; and each of m, n, o and p is an integer of 1 to 5.

18. The switching element according to Claim 1, wherein the compound is a stilbene type compound of the following formula (Q):



wherein each of R⁵², R⁵³, R⁵⁴ and R⁵⁵ is a hydrogen atom, a halogen atom, a nitro group, a cyano group, a C₁₋₆ alkyl group which may have a substituent, a C₁₋₆ alkoxy group which may have a substituent, an aryl group which may have a substituent, or a residual group forming a ring which may have a substituent; each of m and n is an integer of 1 to 5; i is an integer of 1 to 4; and q is an integer of 1 to 9.

19. The switching element according to Claim 1, wherein the compound is a triphenylamine type compound of the following formula (R) :



wherein each of R^{56} , R^{57} , R^{58} , R^{59} and R^{60} is a hydrogen atom, a halogen atom, a nitro group, a cyano group, a C_{1-6} alkyl group which may have a substituent, a C_{1-6} alkoxy group which may have a substituent, an aryl group which may have a substituent, or a residual group which is capable of forming a ring; each of m , n , o and p is an integer of 1 to 5; i is an integer of 1 to 4; and r is an integer of 1 to 2.